Qualitative dynamics of quantum cosmology from loop quantum gravity

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(Dated: February 28, 2019)

In this talk, I shall present our recent studies on qualitative dynamics of three different quantizations of the flat FLRW universe in loop quantum gravity (LQG) from an effective description of the quantum spacetime derived by using the geometric quantum mechanics of coherent states. These include the standard loop quantum cosmology (LQC) and its two recently-revived modifications, referred to as mLQC-I and mLQC-II, respectively. Various features of LQC, including quantum bounce and pre-inflationary dynamics, are found to be shared with the mLQC-I and mLQC-II models. I shall present universal properties of the evolution of the FLRW universe with, respectively, the chaotic, fractional monodromy, Starobinsky, non-minimal Higgs, and exponential potentials, and show various qualitative similarities in the post-bounce phase for all these models. The pre-bounce qualitative dynamics of LQC and mLQC-II turns out to be very similar, but is strikingly different from that of mLQC-I. For all these potentials, non-perturbative quantum gravitational effects always result generically in a slow-roll inflationary phase. Between it and the quantum bounce a phase of super-inflation always exists. Since all of the models agree with general relativity at late times, our results are also of use in classical theory where qualitative dynamics of some of the potentials has not been studied earlier.

• **Ref.:** B.-F. Li, P. Singh, A. Wang, *Qualitative dynamics and inflationary attractors in loop cosmology*, Phys. Rev. D**98**, 066016 (2018) [arXiv:1807.05236].

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